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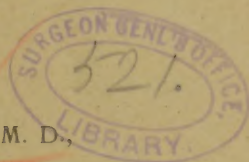
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MILITARY MEDICINE, SURGERY AND HYGIENE.

NOTES ON THE

INTRODUCTION OF TENT FIELD HOS-
PITALS IN WAR.

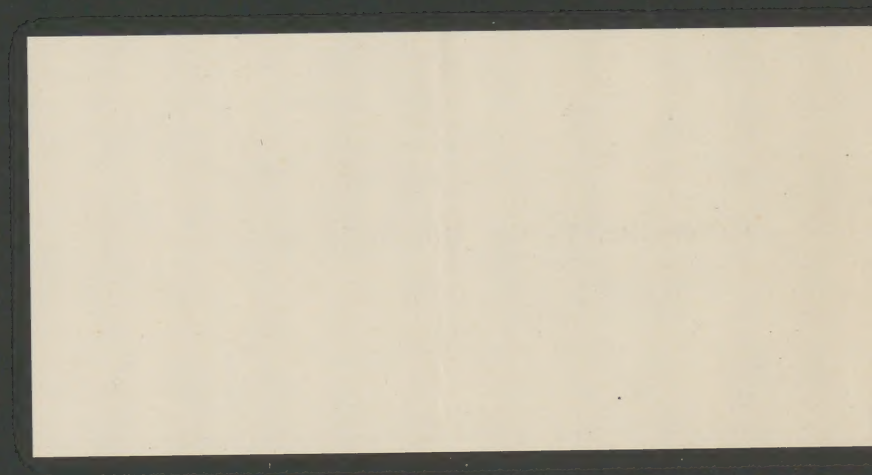
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COMPLIMENTS OF THE AUTHOR.



NOTES ON THE INTRODUCTION OF TENT FIELD HOSPITALS IN WAR.

By COL. B. J. D. IRWIN, M. D.,

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When at war man is seen in his normal state. By civilization his warlike instincts have been restrained; but his aggressive propensities have not been eradicated—merely curbed and held in abeyance through barriers established by social laws. The tendency to exercise his physical strength is manifest in proneness to thrust aside the trammels that restrain his propensity to indulge natural impulse. As a warrior he has been depicted at his best and in the most glowing colors.

It was not until after the sensation of triumph had subsided that Pity was conceived, and only when the weak appealed to man's strength was Mercy born. After those Charity followed, bringing aid for the sick and protection to the helpless. Through the benign influence of those harbingers of Peace, man's savage nature was brought under social control.

In the earliest authentic history of warfare, we learn from the father of Grecian poetry that measures were taken to assist the wounded, and are informed that the surgeons who formed part of the army of Agamemnon combined the duties of warriors with those of the sanitarian, and that they rendered professional aid to those disabled amongst their fellow-combatants. Cyrus and Alexander provided measures for the care and relief of their invalid warriors. In his writings Caesar has left descriptions of the means taken in behalf of the "valitudinarians" of the Roman armies. Of the special nature of the hospitals and professional service of those days we possess no details. During these semi-barbarous ages human life was valued at a low figure. The fate of the wounded soldier was sad in the extreme. In the dark ages his condition was not improved.



Even in the middle ages little attention was bestowed upon the vast majority of the unfortunates who were disabled in war. While the sick nobles and leaders were succored and cared for by friends, the inferior grades of combatants usually had to depend on chance or the interposition of Divine Providence.

In the sixth century of our era the first attempt appears to have been made to organize a system of relief for the wounded on the field of battle, Mauritius having had his armies provided with persons charged with removing from the field those wounded during the battle.

The wars of the Crusaders, with their chivalrous devotion to the weak and infirm, resulted in the organization of a special order of Knighthood—Hospitalers or Knights of Saint John—part of whose duties was devotion to the sick and wounded. To stimulate the religious zeal of the pilgrim-warriors in their holy wars, bishops and clergymen were abundantly provided, but necessary medical and sanitary measures were either neglected or were utterly inadequate to meet even a tithe of the interests involved. Surgeons, so-called, there were, but, as in the days of Trojan warfare, their first duty was to combat the enemy, after which—when not disabled in the fray—they were expected to give some rude measure of assistance to their injured companions.

To Rome belongs the credit of having had one of the earliest hospitals if not the first, established by Fabiola, in the sixth century. Toward the termination of the eleventh century the Emperor Alexius organized permanent hospitals at Constantinople, but the institutions were simply asylums for the collection of invalids, to be fed by the charitable and comforted by the prayers of the faithful.

Under the auspices of that famous surgeon, Ambrose Pare—to whom the profession is indebted for more than one of its greatest progressive strides—field hospitals were first established in France toward the close of the sixteenth century by the illustrious Henry of Navarre. To Pare's influence with Henry Quatre civilization doubtless owes the erection of the magnificent temple—Hotel des Invalides—dedicated to humanity through the munificence of Louis the Fourteenth. The beneficent example offered by that famous institution was promptly recognized by the establishment of Chelsea

Hospital in England, under James the Second, who probably derived his inspirations on this subject through his sojourn at the court of the French monarch.

With the advent of gunpowder in the art of war came also a new era in surgery. Up to the period when the use of firearms introduced a potent factor in changing the nature of the wounds inflicted in personal combat, military surgery had made but little if any progress beyond the crude and ignorant methods of relief followed by the ancients; and hence it was not surprising that the treatment was in keeping with the tardy changes made in the mode of inflicting injury in battle, when muscular strength and personal prowess were mainly relied upon to disable or vanquish an antagonist. Thereafter the days of amulets and shrine cures, of talismans and incantations, of cabbage leaves and loathsome nostrums, as remedial measures, were at an end. The credulity of those suffering from shattered bones or lacerated flesh would no longer be cajoled by imposture; so that the infliction of gunshot wounds heralded improvements that soon developed a rational and scientific system for the management and treatment of military invalids, which, while keeping pace with the progress made in the art of war has, by developing our present enlightened mode of treating the sick and wounded, done much to diminish its dreadful effects upon man. "The great mechanical and material inventions which have multiplied the means of destructive warfare have happily been met by corresponding improvements in the media designed to counteract their evil effects upon human life."

AMERICAN EXPERIENCE IN WAR—WARS IN THE EIGHTEENTH CENTURY.

The war between Great Britain and part of the colonial settlements in North America, after a conflict covering the period from 1775 to 1782, resulted in those colonies being recognized as an independent nation—the United States of America. A second war against the same power commenced in 1812 and was brought to a successful close in 1815. A war against the Republic of Mexico, 1846-1848, was the third and last instance in which the United States engaged in a foreign war. The naval forces of the country have been used in two or three instances to inflict chastisement upon the inhabitants

of semi-barbarous regions, but such acts did not amount to warfare on an extensive scale.

Excepting the periods embraced during the existence of those wars, the army of the United States was maintained on a peace footing. Its members however were engaged in almost perpetual conflict with savage adversaries, ever on the alert to carry desolation and death to the venturesome pioneers who, in their migrations, never hesitated to dispossess the autochthonous inhabitants of their natural inheritance. By thus affording protection to the progressive pioneers engaged in wresting from savage control the vast and fertile regions which have subsequently been developed into powerful States and rich communities, the American army became the shield of the frontier settlers and the picket guard of American civilization. The nature of the conflict waged from year to year between the federal army and its savage opponents although fruitful in the development of personal courage of the most exalted nature, fortitude and patience under extraordinary privations, had little if any tendency to disclose those scientific improvements which in later times have become powerful factors of destruction or useful aids in mitigating some of the horrors of war, even when the nations recognized among the most civilized became the combatants.

When in 1812 the United States declared war against Great Britain, but little if any change or improvement in the management of army invalids had taken place. As in the preceding century, hospitals for the sick or wounded soldiers were almost universally established in villages, towns or cities contiguous to the field of active operations. This was the immemorial custom followed in the European wars, as the thickly populated countries through which transatlantic armies campaigned afforded shelter in private and public buildings, farm houses, barns, churches, barracks, and even in huts and hovels near the camps and battlefields. Ambulances being then unknown, wagons, carts and hand-barrows were pressed into service to bear the wounded from the field of battle to the foul and dreary resting places miscalled hospitals. Comforts, such as hair mattresses, sheets, pillows, etc., were unknown to the sufferers of the wars of Turenne, Marlborough, Wellington, Napoleon, and even those of later date. Straw, hay, or even an earthen floor to repose

upon were deemed comforts of no ordinary character for the accommodation of the sick or wounded soldiers of those times. It is assumed that the possibility of securing farm houses and barns, replenished with hay or straw, has been a potent cause of the predilection shown for such structures when improvising military hospital accommodation to meet pressing emergencies.

Steam not having been utilized as a motive power until a comparatively short time ago, hospital boats or railway carriages for the transportation of invalids remained to be solved in our own day. In 1814 general hospitals were in operation at Plattsburg, Greenbush, Malone, Buffalo, and at Watertown, in the village academy of the latter place. At Lewistown, another was established in two barns, with a number of tents as addenda. The wretched character of these makeshift establishments can be inferred from the following description: "In September the sick in hospital at Plattsburg, numbering 720, were, in view of the approaching fight, transferred to Crab Island. No accommodation had been provided for them on the island, and they remained for three days exposed to the wet and cold, when Dr. Powell determined to transport them to Burlington, which he did in open bateaux across the lake. This crowded the hospital at Burlington to such an extent that the ill effects of crowd poisoning were soon perceived in the increased number of deaths and the slow convalescence of the many. Typhus, dysentery and diarrhoea became prevalent." (History Medical Department of the Army—War of 1812-15, p. 92 et seq.)

Thus it may be seen that the war of 1812-15, following as it did immediately after the great European conflicts between Napoleon and various nations, failed to devise new or develop improvement in hospital construction, or a practicable system for the care and treatment of military invalids. The famous military surgeons of that era, Larrey, Valpeau, Roux, Hennen, Ballingall, Guthrie, and others, appear to have been content with doing as their predecessors had done, and they acted as though they believed that the best that could be done for the accommodation and relief of the wounded soldier consisted in having him, as soon as possible, carted off to the rear of the army, to take his chances between recovery and death in some crowded and ill-pro-

vided building, or at best in some town or village infirmary. The general or base hospitals were on a par with the character of the field service, and the necessary food, furniture and appliances provided, and when compared with those of modern times, were little better than death-traps to those compelled to enter their noisome precincts in quest of relief from suffering.

EXPERIENCE IN THE AMERICO-MEXICAN WAR.

After the termination of the Napoleonic conflicts and those between the United States and Great Britain in 1813-15, the civilized people of Europe and North America remained at peace with each other until 1846, a period of some thirty years, when war commenced between Mexico and the United States. It continued two years, during which the hospital organization for active service was regimental, with base or general hospital for the care of such sick as could not be taken care of with their regiments when the army advanced into the enemy's territory.

After the battles of Palo Alto and Resaca de la Palma, the sick and wounded were sent to Point Isabel, where they were temporarily provided for in hospital tents and by clearing out quartermasters' storehouses. At New Orleans, Baton Rouge and Corpus Christi, barracks and adjacent buildings were fitted up as general hospitals for the accommodation of sick and wounded from the field of operation in Mexico. Those wounded at the battle of Buena Vista were sent for treatment to general hospitals at Saltillo—some twenty miles from the scene of conflict—the slightly injured being treated in the regimental hospitals. During the siege of Vera Cruz, the sick and wounded of the beleaguering army were treated in the regimental hospitals, but, on the capture of the city, a general hospital was established in a building formerly used as a monastery.

Pending the operations before the City of Mexico hospitals were established at Tucabaya and Mexcoac. After the fall of the city they were discontinued and others established in various buildings within the capital, where the sick and wounded of the army were treated.

In the treatment of the wounded during that war the recognized custom of sending the invalids to the base hospitals as soon as possible after the reception of the injuries was adhered to, even under the

disadvantage of transporting them over many hundred miles of rough roads leading from the mountainous interior to the seacoast, after which they were shipped to general hospitals distant from two thousand to three thousand miles from the fields of active warfare!

EXPERIENCE OF THE CRIMEAN WAR.

The next great conflict of arms, known as the Crimean War, was carried on during the years 1854-56, between France, England, Turkey and Sardinia on the one side, and Russia on the other.

In the armies of each of those powers the system followed in providing hospital accommodation for the sick and the wounded exhibits slight change from the long-established customs, and, judged by the notoriously unsatisfactory and sad results, indicates that but little improvement on the important subject involved in the proper management of army invalids had been made during the long interim of peace embraced between the close of the campaigns against the great Napoleon and the advent of that war.

The old and traditionary habit of securing hospital accommodation by seizing upon any and every variety of contiguous building was still followed, and to make amends for their absence, when they could not be found within reach, ill-constructed huts, utterly unsuited for the proper accommodation of the invalids of an army engaged in active warfare, were erected, as the most desirable substitute for the old and favorite resource of former campaigns.

Some idea of the forlorn condition of the invalids of the English portion of the forces engaged in the memorable Siege of Sebastopol may be formed from the following graphic description written by one of the prominent British medical officers, describing the sufferings and privations experienced by the brave and patient men engaged in the laborious struggles involved in the reduction of that famous stronghold:

"From all that has been said on the housing, clothing, food and fuel provided for the soldiers, and the killing toil exacted from them during the period of the war which had most influence on their health and after history, the sad picture may be formed of their position in the Crimea. Day after day passed in severe bodily exertion and anxious watching—one moment digging laboriously in extending approaches, and the next with arms in hand repelling the assaulting

enemy; almost always wet, exposed without cover to the drenching rain and soaking snow, the keen frost and biting winds; standing for days in wet mud, constantly either unnaturally excited or depressed; their dirty, besmeared clothes in rags, their bodies covered with loathsome vermin, which seemed to grow out of their very flesh; no comforts in their wind-pierced tents on the bleak plateau; no fires, unless weary and foot-sore as they were, they dug beneath the snow-covered sod for wet roots wherewith to kindle a feeble tantalizing blaze; without food till after hours of persevering exertion, they managed to half cook their impalatable ration over their winking fires; huddled into a crowded tent to pass the night in close, noisome atmosphere, on the oozy ground, covered by the same blanket which protected them in the wet and muddy trenches; longing for the morning, though its early dawn was signaled by bugle sound which called them to a renewal of that dread task which made them yet again sigh, 'Would to God it were night.' This is no exaggeration. Can we, then, find anywhere else in reality—nay, may we, by the utmost stretch of imagination conceive a more frightful field for the seeds of disease, or the harvest of death, than is here presented to us in camp of the weary, anxious, unaided soldiers who fought so gallantly, endured so constantly or died so nobly, and who now consecrate, by their humble graves, the green hillsides and lovely valleys of the Crimea?

"The bare remembrance of that frightful combination of circumstances which seemed to encircle our army, as with ever-contracting walls of iron, and made prisoners for the dread scourges, cholera, fever and dysentery, that, like the angel of Sennacherib, destroyed our noble and gallant army, comes to one's memory like the awful vision of a distempered dream. These must be recalled, as they had a most important influence on the annals of war, and much that would otherwise be unintelligible becomes clear as noon-day when read by the light thrown on it by these circumstances.

"But if such a condition of things as I have fully outlined was trying to the strong, how can I express its influence on the weak! It is impossible fully to realize the hopeless condition of the sufferers, struck down by enfeebling sickness or exhausting wounds, and deprived of the vigor which alone made hardships endurable.

" The regimental hospital marquee and the round bell tent which served as hospitals were of necessity vastly overcrowded. The former, which ought to have contained twelve to fifteen men was made, from the exigency of the service, to cover three times that number. The unsuitableness of the bell tent to hospital purposes has been fully expressed by commissioners when they said: 'Whatever may be the supposed advantages which have led to its adoption as a barrack tent, it would be difficult to contrive anything much more unfit for the accommodation of the sick.' There were no bedsteads, and those patients who had empty sacks to lie upon were considered fortunate. Few blankets belonged to the hospitals and the food provided was but ill adapted for invalids; nay, in many instances, constituted a veritable poison; medicines, even the most necessary, were but scantily provided; attendance by overworked, and in many cases sick doctors, and by a handful of orderlies, themselves for the most part convalescents, soured and crabbed by the hardships and fatigue to which they were exposed—such was the condition of the sick during the first winter. If to sickness were added wounds—a broken limb or contused body—how small was the chance of recovery? The man lost hope. Every circumstance forbade recovery. The powers of evil seemed to grasp his destiny. The problem of life was being solved by every conceivable antagonism having a voice in the momentous decision. Such being the circumstances given, how could any other result follow than a mortality which caused our land to ring with the voice of mourning, and which for a moment paralyzed our senate and our people? The wildness of despair is the only excuse which can be made for the blame of so much misery having been cast on the medical department, which had no control whatever over the events that led to it, and the voluntary sacrifice of whose members, though glorious to themselves, were unable to retrieve the deplorable errors committed by others.

" The general hospital to which men struck down in the trenches were first carried, consisted at first of twenty and latterly of thirty Portsmouth huts. These huts were originally erected for the barrack accommodation of the 14th and 39th regiments, and were not used for hospital purposes till late in the spring of the latter year. Each hut measured twenty-seven feet by fifteen inside, and contained

during the siege fourteen beds. The air contained in those huts allowed about 260 cubic feet to each of fourteen patients. Being constructed of single boards, and roofed with felt, they were not impervious either to wet or cold. In wet weather water decks had to be constructed of water-proof sheeting."

With such defective hospital provisions it is not surprising to learn that disappointment and disaster followed and that the relatives and friends of the gallant men who, at the sacrifice of health and at the peril of their lives were struggling against such adverse circumstances to maintain the honor of their country, should have been grieved and shocked beyond measure. Even at this remote date it is truly amazing to realize that during the two years of extensive warfare waged between nations endowed with the highest order of intellectual development and possessed of vast wealth—including the appliances of modern civilization—the most advanced kind of hospital provided for field service by one of the most enlightened peoples involved progressed no farther than the single step of substituting flimsily-constructed huts for the absent cabins or analogous structures, improperly depended upon at that time to afford shelter to soldiers disabled in campaign. Men severely wounded or prostrated by dangerous disease were hurried from the field, packed into crowded transport-ships and conveyed to the improvised hospital dens established at or in the neighborhood of Constantinople, where death ran riot amongst the inmates. With such disastrous results, no wonder that the friends of those unfortunate men were shocked at the fearful mortality that swept so many of them into untimely graves. Had they been allowed rest and afforded suitable shelter near the site of their gallant deeds, how many precious lives that were sacrificed to the pernicious custom of hurrying off the wounded and the sick to the base hospitals might have been saved, can only be surmised at this date.

While the allied armies were encamped at Varna, cholera having become epidemic among the troops, the French medical officers were obliged to treat a large number of their sick under canvas with the most encouraging and satisfactory results, demonstrating the vast advantages of treatment in tent hospitals over those obtained in improvised hospitals in buildings. But unfortunately the lesson seems

to have ended there, as it was not followed up in the Crimea, by extending to the wounded the benefits of the suggestive experience gained but a short time previously in Bulgaria. I can not do better than read a striking illustration of the value of that experience in the words of one of the few recognized authorities who has written on this important sanitary subject:

"Mr. Levy was not led by theory to resort to the employment of tents—it was dire necessity—the mother of invention inspired it and provoked the progress. * * * Without recounting the terrible ravages of the cholera in the Piræus in the confined buildings, such as the eastern lazaretto, and at Gallipolis, in the enclosed dilapidated Turkish houses which affected the hospital service, we found at Varna the elements combined to afford a decisive comparison. The two interior hospitals had received from July 10 to September 18, 1854, 2314 cholera cases, of whom 1389 succumbed to the disease; that is to say 166 of those patients gave one hundred deaths! In the three hospitals under tents 2635 cholera cases were received of whom 698 died, equal to one hundred deaths in 376 patients, an extraordinary favorable proportion. * * * Another benefit: The enclosed hospital at Varna retained for a long time, in spite of all efforts, a certain power of infection; with the tents no infection; no fears for such; not a medical officer succumbed while seventeen paid with their lives their devotion to the cholera patients treated in the confined hospital buildings of Gallipolis, Adrianople and Varna. The separation of the sick in tents into groups of from three to eight is a veritable scattering; between the tents the ample amounts of free atmosphere outside; the hospital building circumscribed, condensed, gather the morbid germs, whatever they may be; the tent hospital separates, disperses, dissipates them. The chances of infection and contagion are greatly lessened in the tent, while they are at their maximum in the hospital building."

Could there be anything more convincing than such satisfactory experience? Yet, within a few short weeks thereafter, the lesson was disregarded and ignored and, as the consequence, much unnecessary suffering and loss of life were the sad results. Surely this could not have resulted from indisposition to countenance an innovation, since recognized and so practically demonstrated as the best and most

reliable system that can be devised to meet the wants of the sick and the wounded of an army engaged in active service.

LESSONS OF THE WAR OF THE AMERICAN REBELLION.

In April, 1861, war between the national government of the United States of America and the soi-disant Confederate States commenced and, after a series of brilliant campaigns and many sanguinary battles, was brought to a successful termination by the complete restoration of Federal authority throughout the revolted States in the corresponding month of 1865. For the first time in the history of war a well-equipped, disciplined army of upwards of a million soldiers was seen marshalled by a single power in defence of national integrity. War was levied and conducted on a scale commensurate with the nature of the interests at stake and the resources of the powerful and enthusiastic communities involved in the gigantic conflict. In order to understand what progress or improvement in the care of military invalids in the field had been made during the interim embraced between the close of the war with Mexico and the commencement of the War of the Rebellion, the language of Surgeon Charles H. Tripler, U. S. A., the first Medical Director of the Army of the Potomac, is submitted in the terse and graphic words of one of the most observant and devoted officers of the branch of service of which he was an illustrious member:

He wrote, "I joined the Army of the Potomac August 12th, 1861, and was immediately charged with the organization of the medical department. * * * The army was encamped on the south side of the Potomac, covering an extent of some miles, from Arlington Heights to Alexandria, several miles down the river, and in and about Washington. There were some five or six hotels, seminaries and infirmaries in Washington and Georgetown occupied as general hospitals under capable officers, but with no system in reference to admission or discharge of patients. Every regimental surgeon sent what men he pleased to the general hospitals, without knowing whether there was any room for them or not, and men were discharged from the hospitals with no means provided to insure their return to their regiments. It was not an unusual circumstance for sick men to pass the night in the ambulance, wandering about the streets from hospital to hospital seeking admission. I could find no

information anywhere as to what regiments were present or whether they had medical officers or not. * * * The regulations of the Army recognized only regimental and general hospitals. The regimental hospitals in the field were established in tents or in such buildings as might chance to be within the limits or in the immediate vicinity of each camp. The general hospitals available for the Army of the Potomac were the few old hotels or similar buildings occupied as hospitals in Washington, Alexandria and Annapolis. There was no authority for any hospital establishment in the vicinity of the division or brigade that might relieve the regimental hospital tent. * * * The buildings already provided and occupied were seen at once to be totally inadequate. The entire hospital establishment in the above named cities contained only 2700 beds."

Such were the first meager attempts to provide hospital accommodation for the invalids of an army numbering 140,000 to 180,000 men preparing for active service in the field! In further illustration of the disappointment caused in the public mind and the confusion resulting from the absence of an adequate system of hospital organization to meet the demands of the vast numbers of military invalids suddenly thrown upon the hands of the medical service, the words of Dr. Tripler will convey some faint index of the annoyance and unlooked-for interference that handicapped the medical department in the discharge of its onerous duties:

"I may mention here that a great deal of presumptive intermeddling with the medical department of the army occurred from time to time. Sensational preachers, village doctors, and strong-minded women, suddenly smitten with a more intricate knowledge and thorough perception of the duties and administration of the medical department of an army than I had been able to acquire in more than thirty years' experience and study, obtruded their crude suggestions, and marring where they could not make, and paralyzing where they attempted to quicken, succeeded by their uninformed zeal, innocently enough, perhaps, but not the less unfortunately on that account, in defeating measures I had much at heart, had carefully contemplated, and intended to carry into effect at the proper time.'

Manifestly the provisions made for the accommodation of the invalids of the troops concentrated around Washington, preparatory to taking the field, were of the old-fashioned character and as crude as they appear to have been unsatisfactory and inadequate to meet the necessities of a large army on active service. The hospital service in the armies operating in the Western and Southwestern States was first formulated in accordance with the system followed in the Eastern armies, but when tested proved even more objectionable and unreliable. The sparsely settled nature of the country through which the Western armies campaigned, and the vast distances traversed between one objective point and another, demonstrated that very little or no reliance could be placed upon the makeshift custom of finding buildings for hospital purposes along the routes taken by the marching columns. In thickly populated countries, where towns and villages are not far apart, armies have heretofore relied upon the probability of finding structures of one kind or another contiguous to the sphere of military operations, wherein at least temporary shelter could be secured for those rendered hors de combat by casualty or disease. But when our armies entered on campaigns in the southwestern regions of the soi-disant Confederate States, they moved away from railways and navigable streams, and were thus early taught the necessity of relying upon their own resources to provide shelter for their disabled comrades. That experience soon suggested modification of the old makeshift manner of providing field hospitals and resulted in a system that has revolutionized the manner of providing for the care of sick and wounded soldiers by rendering armies in campaign independent of fortuitous circumstances for the management of those of their numbers who become helpless through incidents of active service. In exchange for the huts and hovels, until then looked upon as the natural retreat for the invalids of an army in the field, the tent offered a convenient, portable and reliable substitute. As to when and by whom it was first used, that is a matter involved in the realms of doubt and uncertainty, but we know that the tent has been in use as one of the earliest forms of human habitation, and that it has undergone various modifications and changes in form and material can be conjectured when its modern mutations and

present variety of form are compared with those indicated by historical allusions to Pelides' lofty tent:

"Of fir the roof was raised, and covered o'er
With reeds collected from the marshy shore."

* * * * * * *

"With solemn pace through various rooms he went,
And found Achilles in his inner tent."

* * * * * * *

The forerunner of permanent dwellings was the tent of one form or another, and since the dawn of civilization to the present time it has afforded comfortable and portable dwellings to nomadic or pastoral people, especially to those of Central Asia, Arabia, Northern Africa and the aboriginal inhabitants of the great plains of North America.

At first the hospital service in the armies operating in the South-western States was formulated after the old-fashioned defective system followed, and when tested proved unsuitable until experience caused modifications and improvements necessary to meet the demands made upon it.

The first great battle of the war was fought April 6th and 7th, 1862, at Shiloh, Tennessee, and resulted in many thousand casualties. The Medical Director of General Buell's army, Surgeon Robert Murray, subsequently Surgeon General, U. S. A., writing of the result of the two days' sanguinary conflict, describes in graphic language the crude provisions made for the professional treatment of the sick and wounded after the battle:

"I arrived at Pittsburg Landing at 10 o'clock a. m., 7th, and found the main depot for the wounded established at a small log house near the river, about half a mile from the line of battle, at the commencement of Monday morning's engagement, and a little over a mile from our line at that time. * * * Many of the wounded had been put on board the commissary and quartermaster's store-ships.

"Hospital boats and other steamboats were filled with sick and wounded and not a few skulkers were carried off to Northern cities. The whole affair was unsatisfactory to me. Our army—Buell's—was hurried up to take part in a terrible battle, leaving all

the tents, bedding, ambulances and medical supplies behind. I arrived when the second day's fight was half over, and found some five or six thousand wounded to be provided for, with, literally, no accommodation or comfort, not even the necessities of life; no bedding, no cooking utensils or table furniture, not even fresh beef for the first day. It was raining incessantly and the mud was very deep; it was impossible to obtain tents enough to shelter the wounded, or straw for them to lie upon. The battle was raging a mile and a half in front, and, for two days after the fight, all the effective and well organized soldiers were held in readiness for another conflict. The only details of men provided to act as police for the hospital depots, and as nurses, cooks and attendants, were from the panic-stricken mob who had sought safety on the banks of the river. * * * Much of the time of the insufficient number of medical officers we had was occupied in procuring food and attendants for the wounded, and even in pressing in details of men to bury the dead, who were left for days unburied about the hospital depots. Many of the wounded were not even dressed before they were sent off. By sad experience of the battle I am confirmed in the opinion of the absolute necessity of the addition to the medical department of a corps of medical purveyors, who, in addition to furnishing medical supplies, shall act as quartermasters and commissaries to the medical department in furnishing quarters, transportation, furniture, provisions, etc., for the sick and wounded. And also, that there should be a large number of enlisted hospital attendants attached to the medical department. They should have no other duty but to nurse and attend to the sick, should have a distinct uniform, and be thoroughly instructed in their duties."

From the above it will be perceived that to Surgeon General Murray, U. S. A., belongs the credit of being the first to perceive and officially point out the urgent necessity that called for the organization of a distinct and permanent hospital service for the proper care of military invalids. The value of his suggestions were fully appreciated, and soon thereafter men and officers were detailed to constitute a provisional Ambulance Corps, charged with the sole duty of caring for the wounded and the sick of the armies in the field.

During the latter years of the war the advantages of a properly organized ambulance service was so satisfactorily demonstrated

that legislative measures were enacted for its permanent organization as a distinct branch of the military establishment of the United States, and foreign countries followed our example by promptly availing themselves of the benefits of our experience. In subsequent European wars the system was further improved, and finally adopted as an essential integral organization of all properly equipped armies. Although first established in America, its adoption as a separate organization of the Regular Army of the United States was for particular reasons deferred until quite a recent date.

In the discharge of my duties as Medical Inspector of the 4th Division of the Army of the Ohio during the battle of Shiloh, it became necessary to have one of the operating stations moved forward to a deserted farm house, situated on an open piece of level, unbroken ground. The presence of a spring of cool, potable water and the nearness of the building to a small branch of a creek were advantages that were promptly recognized, and but a short time had elapsed ere these valuable desiderata were utilized in affording shelter and other comforts for the large number of wounded of our own division and those of the contending forces who had been disabled on that part of the battlefield during the conflict of the preceding day and left without assistance some twenty-four to thirty-six hours. The proximity of the operating station to the recaptured camp of a division of our troops who had been driven therefrom and partly captured by the enemy during the preceding day, suggested the utilization of the abandoned tents for the use of the wounded. As soon as the battle ceased the regimental hospital tents, commissary tents, and the wall-tents were accordingly taken possession of, and within a short space of time were removed to and pitched in regular camp order on the level ground by which the house was surrounded. The building afforded an operating room, dispensary, office, kitchen, dining-room for the officers attached to the establishment. Long into the night the ambulances continued to bring in the wounded who, after receiving the necessary professional attendance, were made as comfortable as possible, by being supplied with an abundance of warm food, good bedding and shelter against the inclement weather. Next day the camp was enlarged and systematically arranged and the tents increased so as to conveniently accommodate some three hundred

patients. All bedsteads, cots, bedding, cooking and necessary utensils, hay and straw found in the recaptured camp were appropriated for the use of the hospital, and on the evening of the 8th the Division Medical Purveyor reached us, bringing our medical supplies and hospital stores. By that time the hospital had already assumed the proportion and discipline of a well-regulated regimental camp, arranged with a view to meet the special wants of those for whom it had been established. Some mattresses had been secured, and the bed-sacks, filled with hay or straw, were placed on cots or improvised bunks, so that every patient was provided with comfortable sleeping accommodations. A suitable number of attendants of each class were detailed for duty in the establishment, which was placed under the charge of a competent executive medical officer, aided by the necessary number of professional assistants, so that the invalids were promptly and regularly supplied with abundance of properly prepared nutritious food, and even a fair supply of extra diet, and delicacies were served to the inmates who needed special attention. It soon became manifest that the wounded who were accommodated in that improvised field hospital were better provided for and more comfortable in every particular than those who were hurried aboard the crowded transports.

Commenting upon the arrangements made for their succor, Medical Director Murray wrote: * * * "Assistant Surgeon Irwin deserves great credit for his admirable management on the field as well as for his promptness and professional skill in the care of the wounded. He found a house on the left of the field where his division was engaged, and by securing tents from the neighboring camps, and collecting camp furniture, he succeeded in organizing and putting in good working order a hospital for three hundred patients, partly of the wounded of his own command, partly of those of General Grant's army, who were wounded in that part of the field on Sunday, and partly of Confederate wounded. These were so well taken care of in every way that I designated them as the last to send on board of the boats."

In the advance of the army on Corinth soon afterwards advantage of this valuable experience was taken. Surgeon Charles McDougal, Medical Director of the Army of the Tennessee, writing

relative to the operations of the combined armies of Generals Grant, Buell and Pope, subsequent to the battle of Shiloh, and the manner of disposing of the invalids of their armies, estimated that nearly eleven thousand had been sent away, but recommended the establishment of hospitals in the rear of the several armies, which was approved and carried into effect by using large numbers of tents pitched in suitable order as division field hospitals. Many deaths having resulted from typhoid fever, after the advance of the army from the banks of the Tennessee, orders were given that no fever patients should be moved until convalescent, thus recognizing and taking advantage of the benefits by the tent hospitals established for the accommodation of the sick and the wounded of the armies concentrated for the reduction of the strong works erected by the Confederate forces for the defence of Corinth, Mississippi.

During the campaign of the Army of the Potomac on the Virginia Peninsula, there is no record of suitable hospitals having been established for the vast number of sick and injured pertaining to that army. Hospital boats and transports were kept on the adjacent waters for the purpose of conveying the invalids to the towns and cities in rear of the army.

The advantages of tents as field hospitals over barns, dwellings, and similar buildings were recognized soon after the battle of Shiloh. Surgeon General W. A. Hammond, U. S. A., in his *Military Hygiene*, edition of 1864, wrote that: "The best field hospitals, both for summer and winter, are tents. After the battle of Antietam, September, 1862, a field hospital was established near the battlefield which may be conceded a model hospital for such establishments. It was kept in operation during the entire winter, and had at one time over one thousand wounded men in it." Dr. Hammond emphasizes the great advantages of field hospitals over those located in permanent buildings in towns, and adds that "nothing is better for the sick and wounded, winter and summer, than a tent."

In contrast with this satisfactory experience is the sad condition of a so-called field hospital at Lewiston, during the war with Great Britain, in 1812-15, which consisted of two barns, each forty feet square, in each of which were placed one hundred men, but, as they were too much crowded, some tents were furnished and more room was given by removing a part of the patients, so that sixty patients

were comfortably accommodated in each barn. Doctor Mann, the medical officer in charge, remarks that: "They were the most comfortable summer hospitals which he saw during the campaign, although when they each contained one hundred men the allowance of superficial area to each patient was but sixteen square feet, indicating that the invalids must have been in contact."

During the Spanish "Peninsular War" against the French under Marshal Soult, Sir James MacGrigor, Chief Medical Officer of the British contingent, established hospitals in the rear where the men were received en route to the depots, but there is an absence of detail to indicate the character of the field service provided for the reception and treatment of the wounded in the field.

M. le Docteur le Baron Larrey, describing the plans adopted by the French in the Italian war of 1859, adverts to their former experience thus: "At Constantinople, during the Crimean War, the hospitals were apparently very well established; the best buildings in Constantinople were assigned to them, and they were arranged with all the accuracy of organization which distinguishes the French. The results were not, however, favorable, especially in the spring of 1856, when typhus spread through many of the hospitals and caused great mortality. Taught by this experience, in 1859 the French distributed their sick in small hospitals whenever they could find a building."

From the foregoing it will be perceived that only two years prior to the commencement of the American War of the Rebellion French military surgeons clung to the belief that a permanent building was a necessary desideratum for the establishment of an hospital. One of the most valuable lessons taught by the experience of the American war of 1861-65 was the demonstration of the inestimable value of the tent as a hospital, and as a reliable substitute for the pick-up structures, obtained by chance, into which the sick and wounded of armies in the field were up to that time huddled.

Parkes, later Professor of Military Hygiene in the British Army Medical School, than whom there never has been a closer observer in all that concerns the comfort and welfare of the soldier, in the second edition, 1866, of his invaluable work on military hygiene, observed that: "The French, Austrian and American experience is in favor of having the hospitals in rear made of tents or wooden huts.

They are largely used by the Federal Americans, who gave up entirely converting old buildings into hospitals."

In a later edition of that work de Chaumont, Professor of Military Hygiene at the Army Medical School at Netley, emphasizing his convictions of the value of the tent, wrote: "That it will perhaps not be out of place again to write on the great advantages of temporary field hospitals over those located in permanent buildings in towns," and quotes the precepts of Hammond: "That nothing can be better for the sick and wounded, winter and summer, than a tent or a ridge-ventilated hut. The experience gained during the present war establishes this point beyond the possibility of a doubt. Cases of erysipelas or of hospital gangrene occurring in the old buildings, which were at one time unavoidably used as hospitals, but which are now almost displaced for the ridge-ventilated pavilions, immediately commenced to get well as soon as removed to tents. But in one instance that has come to my knowledge has hospital gangrene originated in a wooden pavilion hospital, and in no instance, as far as I am aware of, in a tent. * * * Again, wounds heal more rapidly in them, for the reason that the full benefit of the fresh air and the light are obtained. Even in fractures the beneficial effects are to be remarked."

De Chaumont sums up by saying: The hygiene of field hospitals in war (the rules are derived from our own Crimean experience, and that of the wars which have taken place since) as follows: "The field, including intermediate hospitals, to be made of tents."

It was laid down as a rule by Parkes in 1866, that the old regimental hospital was abolished, the sick being first treated in the field hospitals in rear, which are evacuated as occasion required by transfer of the patients to the general hospitals at the base. It is quite certain that good tents are much better than any buildings which can be got. * * * The Austrian experience seems to be in favor of making it of tents. * * * It must be a great advantage to have it made of tents; they have all the advantages of separate houses both as to ventilation and separation of patients; have excellent ventilation, can be shifted from ground to ground or place to place; erysipelas or hospital gangrene is extremely rare in them. * * * It seems now quite clear that these hospitals should not

be the ordinary buildings of the country adopted as hospitals. Such a measure seldom succeeds, and the mere adoption is expensive, though probably always imperfect. Churches should never be taken, as they are not only cold but often damp, then often exhalations from vaults."

Notwithstanding that the suitability and value of tents for field hospitals were clearly demonstrated during the great and protracted civil war in America, and their superiority over improvised hospitals was fully recognized by the best authorities on the subject, it is a matter of surprise to find that during the Franco-Prussian War the sick and wounded of the contending armies seldom received more than temporary professional treatment or relief on the field; those *hors de combat* were hurried to the base hospitals in the rear as rapidly as possible, and transported long distances to the towns and cities, where most of them were received into hospitals improvised to meet the sudden exigencies of active military service. It is true that the French might plead in extenuation their desire to secure possession of their invalids, but no such motive could have actuated the German authorities, as the rear of their armies was so thoroughly protected that the connection with their supplies and their homes was not at any time seriously endangered. And yet but few of their wounded were detained to receive the benefit of treatment in the field hospital. As to the character of the improvised hospitals prepared for the accommodation of the sick and wounded French soldiers, who fought so gallantly, under so many discouraging disadvantages, to maintain the renown of their arms and the glory of their country, the words of one of England's most observant writers afford a graphic picture of the condition of those whose misfortune caused their subjection to the baleful effects accompanying treatment in improvised hospitals in buildings compared with the beneficent results secured to their more fortunate comrades who were treated in tent hospitals *a la Americain*:

"The number of the wounded in my hotel has considerably diminished, owing to deaths among them. For the *Societe Internationale* to have made it their central ambulance was a great mistake. Owing to the want of ventilation, the simplest operations are usually fatal. Four out of five of those who have an arm or leg amputated

die of pyæmia. Now, as in the American tents, four out of five recover; and as French surgeons are as skillful as American surgeons, the average mortality in the two ambulances is a crucial proof of the advantages of the American tent system. Under their tents there is perfect ventilation, and yet the air is not cold. If their plans were universally adopted in hospitals, it is probable that many lives which are now sacrificed to the gases which are generated from operations, and which find no exit from buildings of stone or brick, would be saved. 'Our war,' said an American surgeon to me the other day, 'taught us that a large number of cubic inches of air is not enough for a sick man, but that air must be perpetually renewed by ventilation.'"

It would be difficult to find a stronger example of the advantages of tent hospitals and disadvantages of hospitals improvised in buildings than the illustration given in the terse and eloquent language of the disinterested and distinguished writer whose description was based upon observation of actual facts.

HOSPITAL SERVICE—ANGLO-EGYPTIAN WAR—1882-3.

The arrangements of the medical department of the army sent from England to Egypt, in 1882, appeared such as would amply provide against every emergency that could possibly arise. The field hospital service was organized and equipped in accordance with the improvements of modern science and practical observations gained since the American war of 1861-5, and was deemed adequate to meet the demands of active campaigning without having to resort to buildings for hospital use. The orders directed the field hospitals on the march to follow in rear of the headquarters and in front of all baggage, and were part of the general hospital service, arranged into movable, stationary and base. The arrangements that would doubtless have proved satisfactory were frustrated "through the culpable carelessness or mismanagement of some parties connected with the transport department service, as it appears that the vessel containing supplies for the field hospital service was not ordered to accompany the expeditionary force entering Egypt through the Suez canal. This oversight was a serious drawback to the usefulness and success of the medical department accompanying the troops in the field, and

resulted in the medical officers being obliged in many instances to resort to buildings utterly unsuitable for hospital purposes."

The principal medical officer, Surgeon General J. A. Hanbury, C. B., describing the sanitary condition of the army, wrote: * * * "On September 17th I arrived at Cairo, and on the following morning drove round the city with an Egyptian official for the purpose of selecting a suitable building or buildings for hospitals.

"Having inspected every building shown to me as available, the large structure in the Citadel, called the Mehemet Ali Palace, was chosen as the most suitable. Bad was the best in this instance. It was not a building I would have selected for a hospital had any other been possible, for no description can convey an idea of its filth at that time. * * * In addition to the ordinary latrines, which are in themselves most objectionable, every room seemed to have been used as a latrine, and on the floors there was a layer of dust, the accumulation of years."

With the facilities offered by the use of tents to secure ample hospital accommodations, with cleanliness and pure fresh air, it is difficult to understand why any urgency should have subjected the helpless sick to being thrust into such disgustingly unfit substitutes for field hospitals. Palaces, in name only, were less inviting than the meanest imaginable hovel. No one can wonder at learning that the unfortunate inmates soon sickened and died in great numbers, despite the fact that "day by day the scrubbing, washing and disinfecting the rooms and privies were carried on; but no remedy, save exposure to the air, was successful in removing the heavy foul smell which at first prevailed throughout."

"At Ghizaeh a field hospital was established in barracks cleaned out for that purpose. (!) A considerable portion of the barracks at Abassiyeh was at once submitted to a process of cleaning, disinfecting, lime-washing and painting, and when ready was open for the reception of the sick." (!)

"In this building (Palace at Ismalia) as in all Egyptian palaces, there was on each floor bath rooms and latrines of the usual Eastern pattern; simply an opening in the marble slab, down which all the excreta were suffered to pass."

After the description of those noisome substitutes for suitable hospitals it is some relief to learn that: "The tents of the enemy secured

at Mahata and Mahameh were utilized (as was done on the battlefield of Shiloh in 1862) by our troops; and as soon as Kassassin was taken possession of, every effort was made to push forward the tents from Ismalia."

There can be little if any doubt that it would have been better for the interests and comfort of the invalids had they been cared for in the open, where any kind of shade from the sun's glare could have been secured, such as afforded by railway stations, verandas, etc., until the hospital tents could have been hurried to the front, than to have been subjected to the discomforts and dangers of these foul and loathsome buildings.

During the Nile Expedition for the relief of Khartoom, the building selected for an hospital at Wady Halfa was the railway station-house. It was well adapted for its purpose and afforded a great contrast to the hospitals at Assum. It was however supplemented by twenty tents and thirteen marquees.

During the Afghanistan war of 1878-80, the instructions for the management of the medical service of the force employed directed that the sick and wounded should be treated in domicile hospitals (field and base) the former of a mobile character. Nevertheless the reports indicate that at Cabool and Kandahar old and filthy buildings were used for hospitals.

In the Boer Rebellion some old huts, formerly used during the Zulu war were used for hospital purposes at Fort Anne, Newcastle, but they were supplemented by some forty-four (44) tents.

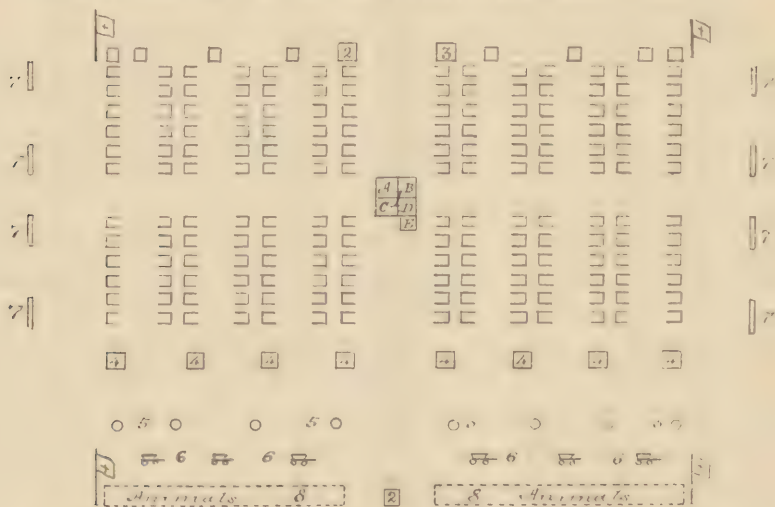
Although the British military authorities were amongst the earliest if not the first to take advantage of the lessons taught by the use of tent hospitals during the War of the American Rebellion, and reorganized their medical service in accordance therewith, it is passing strange to find that despite the excellence of their hospital service in personnel and equipment there should appear later on, during the Afghanistan, South African and Egyptian campaigns, a lingering tendency to cling to the building in which to collect and treat their invalids, instead of providing tents to be pitched on clean, healthy sites, where freedom from polluted environments would have lessened discomfort and saved many valuable lives. With such tendency it is not surprising to know that the management of the medical department of the expeditionary forces engaged in Egypt during the last and

latest war of any magnitude was not crowned with the measure of success which should have rewarded the efforts taken to render the working of that department of the British military service reliable, to provide against all contingencies in accordance with modern scientific experience.

The desideratum of a field hospital accompanying a military force on active service consists of being efficient. To be so it should be ready at all times and under every circumstance to afford the soldier stricken down by disease or by the missile of an enemy, prompt assistance and comfort, shelter and relief from sickness or injury, thereby tending to maintain him in fighting condition with as little loss of time and his strength as possible.

* * * * *

PLAN OF FIRST TENT FIELD HOSPITAL ESTABLISHMENT ON THE BATTLEFIELD OF SHILOH, TENNESSEE, APRIL, 1862.



1. Executive building; A, Office; B, Operating room; C, Dispensary; D, Dining room for officers; E, Kitchen; 2, Guard; 3, Stores; 4, Officers and sick officers; 5, Teamsters; 6, Ambulances and wagons; 7, Latrines; 9, Picket lines.

The above shows that the tent field hospital established April 6-7th, 1862, on the battlefield of Shiloh, Tennessee, consisted, as previously explained, of several hundred wall and hospital tents, arranged in parallel rows, forming avenues or streets that afforded

ready ingress and egress, and facilities to insure thorough hygienic police of the grounds, tents and their environments. The structure utilized for executive purposes constituted the central point of the camp. The outer lines of tents on the right and left were faced inward, the next or second row with sufficient space for a wide street faced outward; the third line with back to back of second faced inward, the fourth outward and the fifth and sixth, forming the central avenue, inwards. Guard and store tents in front; those for hospital officials and invalid officers being arranged with special view to privacy and convenience. Latrines were erected laterally and in rear outside the tent lines. The ambulances, mules and their drivers were accommodated well to the rear of the hospital proper, so as to cause as little inconvenience as possible to the occupants of the establishment.

The arrangement of tent hospitals for the accommodation of large numbers of invalids necessarily varies according to the physical character of the ground and its environments, and more or less in accordance with the fancy of those charged with its organization.

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PRÉCIS OF THE MILITARY HISTORY

OF

B. J. D. IRWIN,

COLONEL AND ASSISTANT SURGEON GENERAL,
U. S. ARMY.

Born in Ireland.—Appointed from New York.

Private, Seventh Regiment, New York National Guard, 1848–1852. Acting Assistant Surgeon, U. S. A., 1855: On duty at Fort Columbus, New York; accompanied troops to Corpus Christie, Texas, and thence to Santa Fé, New Mexico.

Appointed ASSISTANT SURGEON, U. S. ARMY, August 28, 1856.

In New Mexico and Arizona 1855 to October 1861: served with expeditions against hostile Navajo and Apache Indians. Post Surgeon Fort Union New Mexico, from January to May, 1856. Post Surgeon Fort Defiance, New Mexico, May, 1856, to December 1857. Post Surgeon, Fort Buchanan, Arizona, December, 1857, to August, 1861.

Commanded detachments from companies "C" and "H," 7th U. S. Infantry, in an engagement with Chiricahua Indians, near Apache Pass, Arizona, February, 1861, and publicly thanked by order of Department Commander for "excellent conduct" on that occasion. *Awarded Medal of Honor by the Congress of the United States for "distinguished gallantry in action, February 13–14, 1861."*

Promoted CAPTAIN, August 28th, 1861.

Accompanied troops evacuating Arizona to New Mexico; Post Surgeon, Fort Craig, New Mexico. With troops en route from Fort Union, New Mexico, to Fort Leavenworth, Kansas, September, 1861. Post Surgeon, Jefferson Barracks, Missouri, November, 1861.

Medical Director, Department of West Virginia, December 1861—Order rescinded and assigned to Army of the Ohio.

THE HISTORY OF THE
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FROM THE FIRST SETTLEMENT
TO THE PRESENT TIME
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BY NATHANIEL BENTLEY
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IN THE CITY OF BOSTON
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JOHN B. ALLEN, PRINTER
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IN THE CITY OF BOSTON
1856



